

Non-Performing Asset Management in Indian Banking: A Conceptual Framework and Descriptive Evidence on Public and Private Sector Banks

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Abstract

Non-performing assets (NPAs) shape credit supply, profitability and financial stability in India's banking system. This conceptual paper, supported by descriptive empirical evidence, compares public sector banks (PSBs) with other scheduled commercial banks (SCBs) across the 2015 Asset Quality Review (AQR), the Insolvency and Bankruptcy Code (IBC), recapitalisation, and PSB consolidation. It combines (a) official gross NPA data at six dates from March 2015 to September 2025; (b) a purposive synthesis of 35 peer-reviewed studies; and (c) a specified, testable panel model linking governance, credit-risk management, profitability, credit intensity, digital adoption, reform and ownership to NPA ratios.

The PSB gross NPA ratio rose from 4.97% in March 2015 to 14.58% in March 2018 and fell to 2.30% by September 2025; the derived ratio for the other banks rose from 2.28% to 4.49% and fell to 1.73%. The PSB ratio fell by about 84% against about 61%, the PSB share of system gross NPAs fell from about 86% to about 63%, and the PSB-to-other-banks ratio narrowed from about 3.3 to about 1.3. The data are group aggregates at six dates and support descriptive, not causal, conclusions; the model is specified but not estimated. Convergence has been substantial, and a small gap remains.

Keywords: Non-performing assets; public sector banks; private sector banks; asset quality review; Insolvency and Bankruptcy Code; corporate governance; credit risk management; India

1. Introduction

1.1 Evolution of Indian banking and the emergence of NPAs

Since the nationalisation of 14 major commercial banks in 1969 and six more in 1980, public ownership has been central to India's banking system. Nationalisation widened banking outreach and made lending an instrument of development policy. The reforms of the 1990s introduced prudential regulation, capital adequacy norms and income-recognition rules, and later credit expansion, especially to infrastructure and corporate projects, which was followed by a build-up of stressed assets. Researchers have since examined the NPA problem in India from bank-specific, macroeconomic, and policy perspectives (Agarwala & Agarwala, 2019; Arrawatia et al., 2019).

In 2015, the Reserve Bank of India (RBI) began the Asset Quality Review (AQR), after which the Government of India adopted a four-part strategy of recognising NPAs transparently, resolving and recovering value from stressed accounts, recapitalising PSBs, and reforming banks and the financial system (Press Information Bureau [PIB], 2026). The Insolvency and Bankruptcy Code (IBC), enacted in 2016, strengthened creditor rights, and RBI issued a prudential framework for early recognition and resolution of stressed assets on 7 June 2019 (PIB, 2026). Recapitalisation of PSBs followed, and PSBs were consolidated into a smaller number of larger banks (Jasrotia & Agarwal, 2021). On the official figures used in this paper, the gross NPA ratio of all scheduled commercial banks (SCBs) rose from 4.28% in March 2015 to 11.18% in March 2018 and had fallen to 2.22% by March 2025 (PIB, 2025).

1.2 Concept and classification of NPAs

An asset becomes non-performing when interest or principal remains overdue beyond the period prescribed by RBI's prudential norms, generally 90 days for term loans. NPAs are classified as sub-standard, doubtful or loss assets according to the length of time they remain non-performing and the recoverability of dues. The gross NPA ratio is gross NPAs divided by gross advances, and the net NPA ratio is gross NPAs less provisions, divided by net advances. This paper uses gross ratios, which show the stock of stress that has been recognised.

1.3 Problem statement

Asset quality has improved markedly since the March 2018 peak, yet three questions remain open. First, how large was the gap between PSBs and the other banks at the peak, and how much of it remains? Second, which bank-level factors (governance, credit-risk management, profitability, credit intensity, digital adoption) are linked to NPA ratios, and does the link depend on ownership? Third, how should the AQR, IBC and recapitalisation period be read without attributing causation that the data cannot support? This paper addresses these questions through an analysis of official aggregate data, a literature synthesis and a testable model specification.

2. Literature Review

2.1 Determinants of NPAs

Arrawatia et al. (2019) analyse the determinants of asset quality in Indian banks and discuss policy issues, and Swami et al. (2022) identify risk factors that diminish asset quality in Indian commercial banks. Mishra et al. (2021) study macroeconomic determinants of NPAs in a panel of Indian banks, and Garg (2021) examines factors affecting NPAs in the sector. Bawa and Basu (2020) relate operational ability, liquidity, bank capital, and profitability to bank credit risk after the 2013 restructuring-assets reform. International work on macroeconomic and bank-specific determinants (Hess et al., 2009; Louzis et al., 2012) points to the same two families of factors. Agarwala and Agarwala (2019) review the NPA problem in the Indian banking industry.

2.2 NPAs, profitability and efficiency

Gaur and Mohapatra (2021) and Das and Uppal (2021) study the relation between NPAs and profitability in Indian banks. Efficiency studies treat NPAs as an undesirable output: Hafsal et al. (2020) use a two-stage network data envelopment analysis (DEA), Dar et al. (2021) combine DEA, Malmquist, and stochastic frontier analysis with bad output, Goswami and Gulati (2022) examine productivity behaviour during the economic slowdown and NPA crisis, and Das and Ghosh (2005) relate size, non-performing loans, capital and productivity change in Indian state-owned banks. These studies support including profitability in the model, and they raise the reverse-causality problem handled in Section 5.4.

2.3 PSBs versus PVBs

Kandpal (2020) analyses NPAs in public and private sector banks, and Brahmaiah (2022) studies credit-risk management practices across the Indian banking industry. Gupta and Sharma (2023) compare the role of corporate governance in asset quality between government-owned and private banks. Pant and Radhakrishnan (2019) discuss corporate governance challenges in Indian banks from a public-affairs perspective, and Jasrotia and Agarwal (2021) discuss the consolidation of PSU banks. Taken together, these studies make ownership a natural moderator in the framework.

2.4 Corporate governance and asset quality

Gupta and Sharma (2022) examine corporate-governance determinants of asset quality in Indian banks. Tripathi et al. (2023), using data from 2005 to 2018, report that board independence is positively related to bank performance and that mandatory internal committees help reduce NPAs. Brahmaiah and Adaelli (2020) study board characteristics and the performance of Indian banks, and Mayur and Saravanan (2017) study board size, composition and activity in the Indian banking sector. Outside India, Tarchouna et al. (2017) build a governance index to explain non-performing loans in US commercial banks, de Andrés and Vallelado (2008) study the role of bank boards, and Zagorchev and Gao (2015) relate governance to the performance of financial institutions. Gulati (2022) links under-compliance with governance standards to instability in Indian banks.

2.5 AQR, IBC and reform

Chopra et al. (2021) study how the bank cleanup that followed the AQR, together with bank capitalisation, affected lending in India. Bawa and Basu (2020) examine the 2013 restructuring-assets reform, and Jasrotia and Agarwal (2021) examine PSU bank consolidation. The reviewed studies treat AQR, restructuring and consolidation separately; the framework in this paper combines them in a single reform indicator and compares ownership groups over time.

2.6 Review approach and critical synthesis

The 35 studies reviewed here are a purposive set, not a systematic review. They were chosen for relevance to NPAs, asset quality, governance, efficiency and reform in banking, and because their bibliographic details and DOIs could be verified. No formal search protocol (databases, search strings, inclusion and exclusion criteria) was applied, so the set may omit relevant work, and the statements about gaps in Section 4.1 apply only to the studies reviewed.

Three features limit comparability across these studies. First, they use different outcome constructs: asset quality, NPA ratios, credit risk, loan losses, and efficiency or productivity with NPAs as a bad output. Second, ownership is usually handled as a sample split or a control, not as a moderator of the other relationships. Third, most of the Indian studies in the set were published between 2019 and 2023, so they predate the most recent fall in NPA ratios. These features motivate the integrated, ownership-moderated specification proposed in Section 5.4 and the call in Section 9.5 to extend the evidence with more recent studies.

3. Scope of the Study

The study covers Indian scheduled commercial banks classified by RBI. The descriptive analysis in Section 7 uses official aggregate data for PSBs and all SCBs at six dates (March 2015, March 2018, March 2023, March 2024, March 2025 and, provisionally, September 2025), and derives figures for the remaining SCBs (private, foreign and other banks) by subtraction. A PSB-PVB comparison is available only for September 2025. The panel model in Section 5 is specified for a purposive sample of ten large banks (five

PSBs and five PVBs) over 2012-13 to 2024-25, which includes three pre-AQR years as the baseline; it is not estimated in this paper. Because several PSBs were merged in 2019-20, bank identities are to be harmonised using the surviving (acquiring) bank and RBI's group classification.

4. Research Gap, Objectives, Research Questions and Hypotheses

4.1 Research gap

Among the studies reviewed in this paper, the Indian literature on NPAs falls into four largely separate strands: determinants of asset quality (Arrawatia et al., 2019; Mishra et al., 2021; Swami et al., 2022), the consequences of NPAs for profitability and efficiency (Das & Uppal, 2021; Gaur & Mohapatra, 2021; Hafsal et al., 2020), governance and asset quality (Gupta & Sharma, 2022; Tripathi et al., 2023), and the effects of the AQR and related reforms (Chopra et al., 2021). Three gaps follow.

1. **Gap 1 (integration).** Few of the reviewed studies place governance, credit-risk management, profitability, credit intensity, digital adoption and regulatory reform in one framework for PSBs and PVBs. Studies that compare ownership groups directly (Kandpal, 2020; Gupta & Sharma, 2023) do not combine all of these factors.
2. **Gap 2 (ownership and reform timing).** The AQR and IBC period is usually studied for its legal or lending effects, not as a comparison of how PSB and PVB asset-quality paths differ in timing and magnitude.
3. **Gap 3 (identification).** Ownership is time-invariant, profitability is endogenous to NPAs, and the reform indicator is common to all banks. These features make naive fixed-effects or t-test designs unreliable, and the reviewed studies give limited guidance on handling them for ownership comparisons.

This paper responds to Gap 1 by building an integrated conceptual framework, to Gap 2 by a descriptive timing comparison, and to Gap 3 by a model specification that addresses these identification problems explicitly.

4.2 Research objectives

- O1.** To compare the gross NPA ratios of PSBs and the remaining scheduled commercial banks at six dates from March 2015 to September 2025, using official data.
- O2.** To synthesise the evidence on the bank-specific, macroeconomic, governance and efficiency factors associated with NPAs in Indian banks, and on PSB-PVB differences.
- O3.** To compare the change in the PSB and remaining-bank gross NPA ratios, and in the PSB share of system gross NPAs, between the March 2018 peak and September 2025, without making causal claims about the AQR, IBC, recapitalisation or consolidation.
- O4.** To specify a testable panel-data model of NPA ratios, with variables, expected signs and an estimation strategy that addresses the identification problems in Gap 3.

4.3 Research questions

- RQ1.** How did the gross NPA ratios of PSBs and the remaining scheduled commercial banks differ at six dates from March 2015 to September 2025?
- RQ2.** Which factors does the existing evidence associate with NPA ratios in Indian banks, and do these associations differ by ownership?
- RQ3.** How do the size and the relative size of the fall in the PSB and remaining-bank gross NPA ratios, and the PSB share of system gross NPAs, compare between the March 2018 peak and September 2025?

RQ4. Which empirical specification can test the governance, credit-risk, digital and reform relationships with NPA ratios while accounting for ownership?

4.4 Hypotheses and propositions

H1 and H3 are assessed descriptively in this paper. P1 and P2 below are propositions grounded in the literature; testing them is outside the scope of this conceptual paper and is set out as a research agenda.

H1 (descriptive). At every observation date, the gross NPA ratio of PSBs is higher than that of the remaining scheduled commercial banks.

P1 (proposition). Stronger governance, higher profitability, stronger credit-risk management and greater digital adoption are associated with lower NPA ratios, and higher credit intensity is associated with higher NPA ratios when underwriting is weak.

H3 (descriptive). Between the March 2018 peak and September 2025, the gross NPA ratio of PSBs fell by more than that of the remaining banks, in percentage points and in relative terms, and the PSB share of system gross NPAs fell.

P2 (proposition). The association between governance quality and NPA ratios differs by ownership, and the post-reform decline in NPA ratios differs between PSBs and PVBs.

4.5 Alignment of the study design

Table 1 shows how each objective is linked to a research question, a hypothesis, the gap it addresses, the method used, the section reporting the result and the conclusion drawn.

Table 1 Alignment of objectives, research questions, hypotheses, gaps, methods, findings and conclusions

Obj.	RQ	Hypothesis	Gap	Method	Reported in	Conclusion (Section 10.1)
O1	RQ1	H1 (descriptive)	Gap 2	Analysis of official gross NPA data at six dates (Table 4)	Section 7; Finding 1 (8.1)	First: PSB gross NPA ratio above the remaining banks at all six dates
O2	RQ2	P1 (proposition)	Gap 1	Structured synthesis of 35 verified studies	Section 2; Finding 2 (8.2)	Second: determinants identified, but few integrated PSB-PVB studies
O3	RQ3	H3 (descriptive)	Gap 2	Peak-to-latest comparison of ratios and PSB share of system NPAs	Section 7; Finding 3 (8.3)	Third: PSB ratio fell by more than the remaining banks; no causal claim
O4	RQ4	P2 (proposition)	Gap 3 (and 1)	Specified panel model with identification safeguards	Section 5.4; Finding 4 (8.4)	Fourth: specification provided; estimation is the next step

5. Research Methodology

5.1 Research design

This is a conceptual paper with descriptive empirical illustration. The design combines (a) an analysis of official aggregate gross NPA data at six dates, (b) a structured literature synthesis, and (c) a specified panel model for later estimation. The paper does not claim a natural experiment. PVBs were also affected by the AQR and IBC, there is no untreated control group, and the common reform indicator cannot separate reform effects from the general economic cycle. Reform-period findings are therefore reported as associations in timing.

5.2 Data sources and data status

The descriptive evidence uses a single official table from the Ministry of Finance (PIB, 2025) that reports, on one basis (RBI data for scheduled commercial banks), gross NPAs in ₹ lakh crore and as a percentage of advances for all SCBs and for PSBs at March 2015, March 2018, March 2023, March 2024, March 2025 and, provisionally, September 2025. The March 2015 and March 2018 PSB ratios and the March 2018 PSB amount are confirmed by two further Ministry of Finance releases (PIB, 2024; Appendix A). Gross advances are recovered by dividing each gross NPA amount by the corresponding ratio, and figures for the remaining banks (private, foreign and other SCBs) are derived by subtracting PSBs from SCBs (Appendix B). Because the inputs are rounded, derived figures are approximate. A separate Ministry of Finance release (PIB, 2026) gives PSB, PVB and foreign-bank ratios for September 2025 on a domestic-operations basis, which appears to differ from the basis of the main table, so the two are not mixed. A verified annual PVB series was not available and is not used. Bank-level data for the panel will come from RBI's Database on the Indian Economy, bank annual reports and IBBI publications.

5.3 Variables and measurement

Table 2 defines the variables and the expected relationship of each with the NPA ratio.

Table 2 Variables and measurement

Variable	Symbol	Measurement	Expected relationship with NPA
Gross NPA ratio	NPA	Gross NPAs / gross advances × 100	Dependent variable
Net NPA ratio	NNPA	(Gross NPAs – provisions) / net advances × 100	Dependent variable (robustness)
Credit-deposit ratio	CD	Advances/deposits × 100	Positive or ambiguous
Provision coverage ratio	PCR	Provisions / gross NPAs × 100 (recovery rate used as a robustness measure)	Negative for net NPA; ambiguous for gross NPA
Return on assets (lagged)	ROA	Net profit / average total assets × 100, lagged one year	Negative
Governance quality	GOV	Composite index: board independence, audit and NPA/risk committees, board size, meeting frequency	Negative

Variable	Symbol	Measurement	Expected relationship with NPA
Digital adoption	DIG	Index: share of digital transactions, mobile and internet banking, technology-enabled monitoring	Negative
Regulatory reform	REC, RES	REC = 2015-16 to 2017-18; RES = 2018-19 onward; baseline = pre-AQR years 2012-13 to 2014-15	REC positive; RES negative (relative to baseline)
Ownership	OWN	PSB = 1; PVB = 0	Positive; moderator
Controls	—	Bank size (log total assets), capital adequacy ratio	Not hypothesised

5.4 Estimation strategy (specified)

The baseline model for bank i in year t is:

$$NPA_{it} = \beta_0 + \beta_1 ROA_{i,t-1} + \beta_2 CD_{it} + \beta_3 PCR_{it} + \beta_4 GOV_{it} + \beta_5 DIG_{it} + \beta_6 REC_t + \beta_7 RES_t + \beta_8 OWN_i + \beta_9 (GOV_{it} \times OWN_i) + \beta_{10} (REC_t \times OWN_i) + \beta_{11} (RES_t \times OWN_i) + \gamma' Controls_{it} + \mu_i + \varepsilon_{it}$$

The specification addresses the identification problems noted in Gap 3. First, because ownership does not vary over time, bank fixed effects absorb it; the model therefore uses random effects (with a Hausman test) or a Hausman-Taylor estimator, and ownership enters mainly through interactions. Second, profitability is lagged one year, and ROA and ROE are not entered together because they are highly collinear. Third, with only ten banks, standard clustered errors are unreliable, so wild-cluster bootstrap inference is recommended. Fourth, REC (2015-16 to 2017-18) and RES (2018-19 onward) take the same value for all banks in a year; the pre-AQR years 2012-13 to 2014-15 form the omitted baseline, without which the two phase indicators would be collinear with the constant. Their interactions with ownership are a difference-in-differences style contrast, and three pre-AQR years allow only a basic parallel-trends check, so results are reported as associations. Fifth, the comparison of mean NPA ratios by ownership uses Welch's test or the Mann-Whitney test on bank-level means, not a t-test on bank-year observations, which are serially correlated. Controls include bank size and capital adequacy.

5.5 Ethical considerations

The study uses published secondary data and involves no human participants.

Table 3 lists the expected signs and their theoretical basis.

Table 3 Expected signs and theoretical basis

Term	Expected sign	Theoretical basis
ROA (lagged)	—	Credit risk theory: profitable banks have more capacity to absorb and resolve stress (Section 6.2)
CD ratio	+ / —	Credit risk theory: faster lending raises risk when underwriting is weak
PCR	— (net NPA)	Higher provisioning lowers net NPAs by construction; sign for gross NPA is open

Term	Expected sign	Theoretical basis
GOV	–	Agency theory: stronger monitoring reduces NPA formation (Section 6.1)
DIG	–	Better information and monitoring may reduce credit risk
REC, RES	+ (REC), – (RES)	Institutional theory: recognition raises reported NPAs first; resolution lowers them later (Section 6.3)
OWN	+	PSBs have had higher NPA ratios (H1)
GOV × OWN; REC × OWN; RES × OWN	Open	Empirical questions underlying P2; direction not assumed

6. Theoretical and Conceptual Framework

6.1 Agency theory

Agency theory treats a bank's board as a monitoring mechanism between owners and managers (Adams et al., 2010). Studies of bank boards examine how board size, independence and committees relate to bank performance and risk (Adams & Mehran, 2012; de Andrés & Vallengado, 2008; Mayur & Saravanan, 2017). In PSBs the state is the dominant owner, so the monitoring problem differs from that in PVBs, which have dispersed or promoter-based ownership. This difference motivates treating ownership as a moderator of the governance-NPA link (P2).

6.2 Credit risk theory

Credit risk theory links NPAs to borrower and macroeconomic conditions ("bad luck") and to a bank's own underwriting, monitoring and efficiency ("bad management"). Berger and DeYoung (1997) examined the relation between problem loans and cost efficiency in commercial banks, and Podpiera and Weill (2008) tested the bad-management argument in an emerging banking market. Louzis et al. (2012) and Hess et al. (2009) study macroeconomic and bank-specific determinants of loan losses, and Salas and Saurina (2002) compare credit-risk determinants across two institutional types of banks. This perspective motivates the profitability, credit-intensity and credit-risk-management variables (P1).

6.3 Regulatory and institutional theory

Institutional arguments stress that the legal and regulatory environment shapes how problem loans arise and are resolved (Breuer, 2006) and that governance rules matter for bank valuation (Caprio et al., 2007). In India, the AQR, the IBC, recapitalisation and consolidation changed recognition, resolution and capital conditions during the study period (Chopra et al., 2021; Jasrotia & Agarwal, 2021). Regulatory under-compliance with governance standards has also been linked to bank instability using Indian data (Gulati, 2022). This perspective motivates the reform variable and the timing comparison (H3, P2).

6.4 Conceptual framework

Figure 1 summarises the framework. NPA performance, measured by the gross and net NPA ratios, is the outcome. Six predictors are linked to it: governance quality, credit-risk management, digital adoption, profitability, credit intensity and regulatory reform. Ownership (PSB or PVB) is treated as a moderator of these relationships.

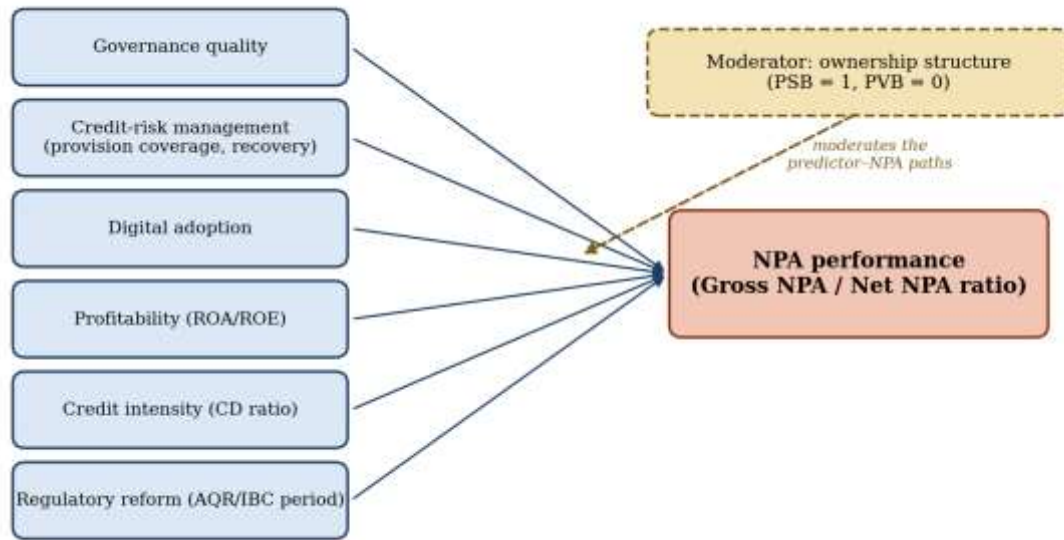


Figure 1. Conceptual framework. The moderator acts on the relationships between the predictors and NPA performance.

7. Results: Descriptive Evidence

Data status. Table 4 reproduces official figures for SCBs and PSBs from one Ministry of Finance table (PIB, 2025) and adds figures derived by the author for the remaining banks (Appendix B). Table 5 uses a separate release on a domestic-operations basis (PIB, 2026).

Table 4 Gross NPAs of PSBs, SCBs and the remaining banks, March 2015 to September 2025

Measure	Mar-15	Mar-18	Mar-23	Mar-24	Mar-25	Sep-25*
Gross NPAs, SCBs (₹ lakh crore)	3.23	10.36	5.71	4.81	4.31	4.18
Gross NPAs, PSBs (₹ lakh crore)	2.79	8.96	4.28	3.40	2.84	2.65
Gross NPA ratio, SCBs (%)	4.28	11.18	3.87	2.75	2.22	2.05
Gross NPA ratio, PSBs (%)	4.97	14.58	4.97	3.47	2.58	2.30
Gross NPA ratio, remaining banks (%) †	2.28	4.49	2.33	1.83	1.75	1.73
Gap, PSBs minus remaining banks (pp) †	2.69	10.09	2.64	1.64	0.83	0.57
PSB ÷ remaining-bank ratio †	2.18	3.25	2.13	1.89	1.48	1.33
PSB share of system gross NPAs (%) †	86.4	86.5	75.0	70.7	65.9	63.4
PSB share of system advances (%) †	74.4	66.3	58.4	56.0	56.7	56.5

Note. Gross NPAs and gross NPA ratios for SCBs and PSBs are reproduced from PIB (2025); March 2015 and March 2018 PSB values are confirmed by PIB (2024). The remaining banks (private, foreign and other SCBs), advances and shares are derived by the author from the rounded official figures (Appendix B) and are approximate. The source does not state the reporting basis; the figures are consistent with RBI's global-operations series. *Provisional.

PSBs held a disproportionate share of system NPAs throughout (Table 4). In March 2015 the PSB gross NPA ratio was 4.97% against 4.28% for all SCBs and a derived 2.28% for the remaining banks. At the March 2018 peak the PSB ratio was 14.58% against 11.18% for SCBs and a derived 4.49% for the remaining banks, and PSBs held about 86% of system gross NPAs although they accounted for about 66% of advances. By September 2025 the PSB ratio had fallen to 2.30% against 2.05% for SCBs and a derived 1.73% for the remaining banks, and the PSB share of gross NPAs had fallen to about 63%, close to a PSB advances share of about 57%.

Table 5 Gross NPA and slippage ratios by bank group, September 2025 (%)

Measure	SCBs	PSBs	PVBs	Foreign banks
Gross NPA ratio	2.15	2.50	1.73	0.80
Slippage ratio	—	0.8	1.8	—

Note. Domestic-operations basis; provisional data for 30 September 2025, as reported by PIB (2026). This basis appears to differ from that of Table 4.

Table 5 gives the September 2025 position on a domestic-operations basis, which allows a direct PSB-PVB comparison. The PSB ratio (2.50%) remained above the PVB ratio (1.73%), and both were above the foreign-bank ratio (0.80%). The Ministry of Finance states that PSBs have recorded a larger decline in gross NPA ratio than PVBs and foreign banks since March 2018, and that the slippage ratio, the fresh accretion of NPAs as a share of standard advances, was 0.8% for PSBs and 1.8% for PVBs in September 2025, having improved for PSBs relative to PVBs over the last six financial years (PIB, 2026).

8. Findings and Discussion

Each finding below corresponds to one objective, research question and hypothesis in Table 1.

8.1 Finding 1: PSB and remaining-bank gross NPA ratios (O1, RQ1, H1)

H1 is supported descriptively at all six dates: the PSB gross NPA ratio was above both the SCB ratio and the derived ratio for the remaining banks (Table 4). The gap to the remaining banks was 2.69 percentage points in March 2015, widened to 10.09 points at the March 2018 peak, and narrowed to 0.57 points in September 2025. In relative terms, the PSB-to-remaining-banks ratio was about 2.2 in March 2015, about 3.3 at the peak and about 1.3 in September 2025, so PSBs are now closer to the other banks than before the AQR. The September 2025 domestic-basis data confirm that the PSB ratio still exceeds the PVB ratio (Table 5). No inferential test is reported, because six aggregate observations cannot support one.

8.2 Finding 2: Determinants and ownership differences in the literature (O2, RQ2, P1)

The reviewed studies cluster into four families of factors: bank-specific and risk-management factors (Arrawatia et al., 2019; Swami et al., 2022; Bawa & Basu, 2020), macroeconomic conditions (Mishra et al., 2021; Louzis et al., 2012), governance (Gupta & Sharma, 2022; Tripathi et al., 2023), and efficiency

or profitability links (Das & Uppal, 2021; Hafsal et al., 2020). Direct ownership comparisons exist (Kandpal, 2020; Gupta & Sharma, 2023), but the reviewed studies do not combine all factors in one specification. P1 is therefore retained as a theory-based proposition. Among the evidence reviewed here, the clearest direction on governance comes from Tripathi et al. (2023), who find that mandatory internal committees help reduce NPAs. For the other predictors the expected signs in Table 3 rest on theory (Section 6), not on a tested result.

8.3 Finding 3: The fall from the March 2018 peak (O3, RQ3, H3)

Between the March 2018 peak and September 2025 the PSB gross NPA ratio fell by about 12.3 percentage points, or about 84%, and the derived ratio for the remaining banks fell by about 2.8 points, or about 61% (Table 4). The PSB share of system gross NPAs fell from about 86% to about 63%. H3 is therefore supported descriptively, in line with the Ministry of Finance statement that PSBs recorded the larger decline since March 2018 (PIB, 2026). The remaining banks also saw their ratio rise sharply between March 2015 and March 2018, which suggests that recognition under the AQR was not confined to PSBs. The timing is consistent with recognition of previously carried stress, followed by recapitalisation, provisioning and IBC-led resolution (Chopra et al., 2021; Jasrotia & Agarwal, 2021), but the data cannot show that these measures caused the decline. The slippage ratios in Table 5 suggest that fresh stress is now relatively greater in PVBs than in PSBs, even though the PSB stock of NPAs is still higher.

8.4 Finding 4: A testable specification (O4, RQ4, P2)

The model in Section 5.4 provides a specification for P1 and P2 that handles time-invariant ownership, endogenous profitability, a small bank sample and a common reform indicator. Estimating it is the main next step. Until then, the governance-by-ownership and reform-by-ownership hypotheses remain untested. From an agency perspective one expects a different governance-NPA relationship in state-owned and private banks (Adams et al., 2010; Gupta & Sharma, 2023), but the direction and size are empirical questions.

8.5 Evidence gap on profitability

This paper does not report a PSB-PVB comparison of return on assets, because a verified group-level series was not available. The Ministry of Finance links lower provisioning to improved bank profitability (PIB, 2026), and the literature relates NPAs to profitability (Gaur & Mohapatra, 2021; Das & Uppal, 2021). Whether ownership-based profitability differences have narrowed alongside asset quality is left to the panel estimation.

9. Implications, Limitations and Future Research

9.1 Implications for bank management

In September 2025 the PSB gross NPA ratio (2.50% on the domestic basis) was still above the PVB ratio (1.73%), so PSBs should not assume that falling system-wide NPAs will remove the remaining difference. The literature on credit-risk management practices (Brahmaiah, 2022) and on board committees (Tripathi et al., 2023) points to underwriting, monitoring and committee effectiveness as areas for attention. PVBs, whose slippage ratio (1.8%) was above that of PSBs (0.8%) in September 2025 (PIB, 2026), should monitor fresh accretions to stress even though their stock ratios are low.

9.2 Implications for regulators

Because convergence is partial, ownership-specific supervisory attention to governance remains relevant (Gulati, 2022; Gupta & Sharma, 2023). Regulators could also publish bank-level asset-quality,

provisioning and governance data in a consistent, machine-readable form, which would allow the panel test specified here.

9.3 Academic implications

The paper offers a replicable specification for ownership-based NPA research and identifies the pitfalls of simple designs: time-invariant ownership under fixed effects, endogenous profitability, a common reform dummy and serially correlated bank-year observations.

9.4 Limitations

First, the panel model is specified but not estimated, so P1 and P2 are untested. Second, the descriptive evidence consists of group aggregates at six dates; it supports no inferential tests, and the figures for the remaining banks are derived from rounded inputs and combine private, foreign and other banks. Third, the main table is on one basis and the PSB-PVB comparison for September 2025 is on a domestic-operations basis, so the two should not be combined into one series, and no annual PVB series was available. Fourth, September 2025 figures are provisional. Fifth, the ten-bank sample proposed for the panel is purposive and favours large banks, so survivorship bias is likely. Sixth, the literature set is purposive and not a systematic review, and most of its Indian studies were published between 2019 and 2023. Finally, the paper does not report a group-level profitability comparison.

9.5 Future research directions

Future work should (a) assemble the bank-level panel for 2012-13 to the latest year and estimate the model, including the governance-by-ownership and reform-by-ownership terms; (b) extend the official series to an annual PSB, PVB and foreign-bank series on one reporting basis; (c) test parallel trends using the pre-AQR years; (d) add studies published from 2024 onward through a documented search protocol; and (e) construct governance and digital-adoption indices from annual reports using transparent coding rules.

10. Conclusion and Recommendations

10.1 Conclusion

This paper compared the non-performing asset (NPA) experience of public sector banks (PSBs) with that of the remaining scheduled commercial banks from March 2015 to September 2025. Its conclusions follow the four objectives. First (O1), the PSB gross NPA ratio was above that of the remaining banks at all six dates. Second (O2), the literature identifies bank-specific, macroeconomic, governance and efficiency factors, but few of the reviewed studies combine them in one framework for PSBs and PVBs, which supports the integrated framework proposed here. Third (O3), the PSB ratio fell by more than the ratio for the remaining banks between the March 2018 peak and September 2025, in percentage points and in relative terms, and the PSB share of system gross NPAs fell, a timing consistent with the AQR, recapitalisation and IBC period but not proof of their effect. Fourth (O4), a specification that handles ownership, endogeneity, a small bank sample and a common reform indicator is provided, and estimating it is the next step.

In terms of the research questions, the answer to RQ1 is that the PSB ratio was 4.97%, 14.58% and 2.30% in March 2015, March 2018 and September 2025, against derived ratios of 2.28%, 4.49% and 1.73% for the remaining banks. The answer to RQ2 is that the reviewed evidence points to four families of factors, with the clearest direction on governance coming from the finding that mandatory internal committees help reduce NPAs (Tripathi et al., 2023). The answer to RQ3 is that PSB ratios fell by about 84% from the peak, against about 61% for the remaining banks, and that the PSB share of system gross NPAs fell

from about 86% to about 63%. The answer to RQ4 is the panel specification in Section 5.4, which is designed to avoid the pitfalls of fixed-effects and t-test designs for ownership comparisons.

The paper contributes in three ways. It brings governance, credit-risk management, profitability, credit intensity, digital adoption, regulatory reform and ownership into one framework. It shows, from official data on one basis, that the PSB gap to the other banks widened sharply to March 2018, then narrowed to below its pre-AQR level, and that fresh stress, as measured by slippage, is now relatively greater in PVBs. It also separates what has been tested descriptively (H1 and H3) from what remains a proposition (P1 and P2), so that readers can see what the evidence does and does not support.

Overall, asset-quality convergence between PSBs and the other banks has been substantial, but a small gap remains, and claims about the effects of governance, digital adoption and regulatory reform remain to be tested once the bank-level panel is estimated.

10.2 Recommendations

The recommendations below follow from the conclusions and are limited to what the evidence in this paper supports. They are grouped by the party responsible for acting on them.

1. **For PSBs: strengthen board oversight of credit risk.** Tripathi et al. (2023) report that mandatory internal committees help reduce NPAs, and Gupta and Sharma (2023) compare governance and asset quality across government-owned and private banks. PSB boards should therefore give credit, risk and NPA-review committees clear mandates, independent members and regular reporting, and should monitor compliance with governance standards, since under-compliance has been linked to instability (Gulati, 2022).
2. **For PSBs: track the remaining gap against private peers.** Because the PSB gross NPA ratio was still above the PVB ratio in September 2025 (2.50% against 1.73% on the domestic basis), PSBs should report their position relative to private peers as well as absolute NPA levels. Studies of NPAs and profitability (Gaur & Mohapatra, 2021; Das & Uppal, 2021) examine how NPAs relate to earnings, and credit-risk management practices (Brahmaiah, 2022) are the practical lever for further reduction.
3. **For PVBs: monitor fresh stress, not only stock ratios.** The Ministry of Finance reports a PVB slippage ratio of 1.8% against 0.8% for PSBs in September 2025 (PIB, 2026). PVBs should therefore track slippages, early-warning indicators and provisioning alongside their low stock NPA ratios, and keep board-level oversight of credit quality in place (Brahmaiah & Adaelli, 2020; Mayur & Saravanan, 2017).
4. **For RBI and policymakers: publish consistent bank-level and group-level data.** Consistent, machine-readable annual series of gross and net NPAs, slippages, provisioning, governance and digital indicators by bank and by ownership group, on one reporting basis, would allow the panel model in Section 5.4 to be estimated and would remove the need to derive group figures by subtraction. Group aggregates also change composition after mergers (Jasrotia & Agarwal, 2021).
5. **For RBI and policymakers: keep recognition discipline and ownership-specific supervision.** The timing evidence is consistent with a recognition phase followed by sustained decline (Chopra et al., 2021), which supports continued consistent asset-recognition norms. Because convergence is partial, supervisory attention to governance may need to differ between state-owned and private banks (Gupta & Sharma, 2023).

6. **For researchers: estimate before attributing.** Estimate the model in Section 5.4 with the identification safeguards described there, use the pre-AQR years as the baseline and test parallel trends, and extend the period to the latest available year, before drawing causal conclusions about the AQR, IBC or governance reforms.
7. **For Researchers: build transparent indices.** Governance and digital-adoption indices should be constructed from annual reports with published coding rules, so that results can be replicated and compared across studies

References

1. Adams, R. B., Hermalin, B. E., & Weisbach, M. S. (2010). The role of boards of directors in corporate governance: A conceptual framework and survey. *Journal of Economic Literature*, 48(1), 58-107. <https://doi.org/10.1257/jel.48.1.58>
2. Adams, R. B., & Mehran, H. (2012). Bank board structure and performance: Evidence for large bank holding companies. *Journal of Financial Intermediation*, 21(2), 243-267. <https://doi.org/10.1016/j.jfi.2011.09.002>
3. Agarwala, V., & Agarwala, N. (2019). A critical review of non-performing assets in the Indian banking industry. *Rajagiri Management Journal*, 13(2), 12-23. <https://doi.org/10.1108/RAMJ-08-2019-0010>
4. Arrawatia, R., Dawar, V., Maitra, D., & Dash, S. R. (2019). Asset quality determinants of Indian banks: Empirical evidence and policy issues. *Journal of Public Affairs*, 19(4), Article e1937. <https://doi.org/10.1002/pa.1937>
5. Bawa, J. K., & Basu, S. (2020). Restructuring assets reform, 2013: Impact of operational ability, liquidity, bank capital, profitability and capital on bank credit risk. *IIMB Management Review*, 32(3), 267-279. <https://doi.org/10.1016/j.iimb.2019.10.009>
6. Berger, A. N., & DeYoung, R. (1997). Problem loans and cost efficiency in commercial banks. *Journal of Banking & Finance*, 21(6), 849-870. [https://doi.org/10.1016/S0378-4266\(97\)00003-4](https://doi.org/10.1016/S0378-4266(97)00003-4)
7. Brahmaiah, B. (2022). Credit risk management practices of Indian banking industry: An empirical study. *International Journal of Economics and Financial Issues*, 12(2), 67-71. <https://doi.org/10.32479/ijefi.12968>
8. Brahmaiah, B., & Adaelli, S. R. (2020). Corporate governance, board characteristics and performance of Indian banks: An empirical study. *International Journal of Economics and Financial Issues*, 10(3), 83-87. <https://doi.org/10.32479/ijefi.9536>
9. Breuer, J. B. (2006). Problem bank loans, conflicts of interest, and institutions. *Journal of Financial Stability*, 2(3), 266-285. <https://doi.org/10.1016/j.jfs.2006.07.001>
10. Caprio, G., Laeven, L., & Levine, R. (2007). Governance and bank valuation. *Journal of Financial Intermediation*, 16(4), 584-617. <https://doi.org/10.1016/j.jfi.2006.10.003>
11. Chopra, Y., Subramanian, K., & Tantri, P. L. (2021). Bank cleanups, capitalization, and lending: Evidence from India. *The Review of Financial Studies*, 34(9), 4132-4176. <https://doi.org/10.1093/rfs/hhaa119>
12. Dar, A. H., Mathur, S. K., & Mishra, S. (2021). The efficiency of Indian banks: A DEA, Malmquist and SFA analysis with bad output. *Journal of Quantitative Economics*, 19(4), 653-701. <https://doi.org/10.1007/s40953-021-00247-x>

13. Das, A., & Ghosh, S. (2005). Size, non-performing loan, capital and productivity change: Evidence from Indian state-owned banks. *Journal of Quantitative Economics*, 3(2), 48-66. <https://doi.org/10.1007/BF03404625>
14. Das, S. K., & Uppal, K. (2021). NPAs and profitability in Indian banks: An empirical analysis. *Future Business Journal*, 7(1), Article 53. <https://doi.org/10.1186/s43093-021-00096-3>
15. de Andrés, P., & Vallelado, E. (2008). Corporate governance in banking: The role of the board of directors. *Journal of Banking & Finance*, 32(12), 2570-2580. <https://doi.org/10.1016/j.jbankfin.2008.05.008>
16. Garg, N. (2021). Factors affecting NPAs in Indian banking sector. *Paradigm*, 25(2), 181-193. <https://doi.org/10.1177/09718907211035594>
17. Gaur, D., & Mohapatra, D. R. (2021). Non-performing assets and profitability: Case of Indian banking sector. *Vision*, 25(2), 180-191. <https://doi.org/10.1177/0972262920914106>
18. Goswami, A., & Gulati, R. (2022). Economic slowdown, NPA crisis and productivity behavior of Indian banks. *International Journal of Productivity and Performance Management*, 71(4), 1312-1342. <https://doi.org/10.1108/IJPPM-01-2020-0010>
19. Gulati, R. (2022). Does regulatory under-compliance with governance standards lead to bank instability? An exploration using Indian data. *Australian Economic Papers*, 61(1), 138-180. <https://doi.org/10.1111/1467-8454.12242>
20. Gupta, P. K., & Sharma, S. (2022). Corporate governance determinants of asset quality in an emerging economy: Evidence from Indian banks. *Journal of Advances in Management Research*, 19(4), 560-577. <https://doi.org/10.1108/JAMR-05-2021-0182>
21. Gupta, P. K., & Sharma, S. (2023). Role of corporate governance in asset quality of banks: Comparison between government-owned and private banks. *Managerial Finance*, 49(4), 724-740. <https://doi.org/10.1108/MF-04-2022-0165>
22. Hafsal, K., Suvvari, A., & Durai, S. R. S. (2020). Efficiency of Indian banks with non-performing assets: Evidence from two-stage network DEA. *Future Business Journal*, 6(1), Article 26. <https://doi.org/10.1186/s43093-020-00030-z>
23. Hess, K., Grimes, A., & Holmes, M. (2009). Credit losses in Australasian banking. *Economic Record*, 85(270), 331-343. <https://doi.org/10.1111/j.1475-4932.2009.00551.x>
24. Jasrotia, S. S., & Agarwal, T. (2021). Consolidation of Indian PSU banks and the way forward. *Journal of Public Affairs*, 21(1), Article e2133. <https://doi.org/10.1002/pa.2133>
25. Kandpal, V. (2020). Non-performing assets in India: A critical analysis of public and private sector banks. *Corporate Governance and Sustainability Review*, 4(1), 65-73. <https://doi.org/10.22495/cgsrv4i1p6>
26. Louzis, D. P., Vouldis, A. T., & Metaxas, V. L. (2012). Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios. *Journal of Banking & Finance*, 36(4), 1012-1027. <https://doi.org/10.1016/j.jbankfin.2011.10.012>
27. Mayur, M., & Saravanan, P. (2017). Performance implications of board size, composition and activity: Empirical evidence from the Indian banking sector. *Corporate Governance*, 17(3), 466-489. <https://doi.org/10.1108/CG-03-2016-0058>

28. Mishra, A. K., Jain, S., Abid, M., & Manogna, R. L. (2021). Macro-economic determinants of non-performing assets in the Indian banking system: A panel data analysis. *International Journal of Finance & Economics*, 26(3), 3819-3834. <https://doi.org/10.1002/ijfe.1989>
29. Pant, A., & Radhakrishnan, G. (2019). Corporate governance challenges in Indian banks: A public affairs perspective. *Journal of Public Affairs*, 19(4), Article e1946. <https://doi.org/10.1002/pa.1946>
30. Podpiera, J., & Weill, L. (2008). Bad luck or bad management? Emerging banking market experience. *Journal of Financial Stability*, 4(2), 135-148. <https://doi.org/10.1016/j.jfs.2008.01.005>
31. Salas, V., & Saurina, J. (2002). Credit risk in two institutional regimes: Spanish commercial and savings banks. *Journal of Financial Services Research*, 22(3), 203-224. <https://doi.org/10.1023/A:1019781109676>
32. Swami, O. S., Nethaji, B., & Sharma, J. P. (2022). Determining risk factors that diminish asset quality of Indian commercial banks. *Global Business Review*, 23(2), 372-384. <https://doi.org/10.1177/0972150919861470>
33. Tarchouna, A., Jarraya, B., & Bouri, A. (2017). How to explain non-performing loans by many corporate governance variables simultaneously? A corporate governance index is built to US commercial banks. *Research in International Business and Finance*, 42, 645-657. <https://doi.org/10.1016/j.ribaf.2017.07.008>
34. Tripathi, N. N., Ahamed, N., & Gupta, R. (2023). Role of committees in bank valuation: Evidence from an emerging market. *Asian Academy of Management Journal*, 28(2), 147-178. <https://doi.org/10.21315/aamj2023.28.2.6>
35. Zagorchev, A., & Gao, L. (2015). Corporate governance and performance of financial institutions. *Journal of Economics and Business*, 82, 17-41. <https://doi.org/10.1016/j.jeconbus.2015.04.004>
36. **Official publications**
37. Press Information Bureau. (2024). *GNPA of PSBs declined from the peak of 14.58% in Mar-18 to 3.12% in Sep-24* [Press release]. Ministry of Finance, Government of India. <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2083695>
38. Press Information Bureau. (2025). *Ministry of Finance year ender 2025: Department of Financial Services* [Press release]. Ministry of Finance, Government of India. <https://www.pib.gov.in/PressReleaseDetailm.aspx?PRID=2213154®=3&lang=1>
39. Press Information Bureau. (2026, February 9). *Gross NPAs of scheduled commercial banks (SCBs) for domestic operations reach a historic low of 2.15% as of September, 2025* [Press release]. Ministry of Finance, Government of India. <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2225442>